

FINAL REPORT

National Marine Fisheries Service
Program 2-363-R
Project IV

The Status and Distribution of Commercial and
Forage Fish in the Missouri River and Their
Utilization of Selected Habitats }

Job I

Fish Survey of the Missouri and Mississippi Rivers

Missouri Department of Conservation

Larry R. Gale, Director

Charles A. Purkett, Jr., Assistant Director

Dan F. Dickneite, Federal Aid Coordinator

James P. Fry, Chief, Fisheries Division

Date prepared:
June 27, 1985

Prepared by: Timothy B. Grace
Principal Investigator

William L. Pfeiffer
Senior Fisheries Research Biologist

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Approved by: James R. Whitley
Fisheries Research Superintendent

ABSTRACT

The objective of this study was to determine the species composition and relative abundance of fishes in the Missouri and Mississippi rivers in Missouri, and to compare this information with earlier surveys. Twenty-nine sites were selected to adequately represent river reaches, habitats, and earlier survey sites. Fishes were sampled primarily by seining and electro-fishing from 1981 to 1983.

Ninety-six species of fish and three hybrids were collected during the survey. Sixty-eight species, 36,740 specimens, were collected from the Missouri River and 84 species, 54,939 specimens, were collected from the Mississippi River. The most abundant species, in decreasing order of abundance, collected from the Missouri River were: plains minnow, emerald shiner, gizzard shad, channel catfish, silver chub, freshwater drum, river carpsucker, red shiner, and river shiner. The most abundant species collected from the Mississippi River were: emerald shiner, gizzard shad, river shiner, threadfin shad, bluegill, carp, red shiner, bullhead minnow, and white bass. No federally endangered species were collected; however, four of the species collected have been designated as "rare" or "endangered" in Missouri.

Project IV: The status and distribution of commercial and forage fish in the Missouri River and their utilization of selected habitats.

Job I: Fish survey of the Missouri and Mississippi rivers

Period Covered: July 1, 1982 to November 30, 1984

Duration of Study: 1982-1984

Objectives: To determine the status of and document the changes in species composition and relative abundance of commercial and forage fishes in the Missouri River bordering or flowing through Missouri. This objective was later amended to include the Mississippi River bordering Missouri.

Expected Results and Benefits: A comparison of data collected with those of Barnickol and Starrett (1951), Fisher (1962), Pflieger (1963), and others, will help determine the present status of the fish fauna in the Missouri and Mississippi rivers, and indicate changes in composition over the past 40 years. An analysis of the habitat preference of forage fishes and commercially important species will help us better manage the fish populations of these two rivers.

Procedures: Fish collections were made at 29 sites on the Missouri and Mississippi rivers from 1981 to 1983 (Fig. 1). Sampling sites were selected to adequately represent river reaches and to facilitate comparisons with earlier surveys. Collections were made at 13 sites on the Missouri River: Brownville (MO-1), Rulo (MO-2), St. Joseph (MO-3), Leavenworth (MO-4), Lexington (MO-5), Miami (MO-6), Glasgow (MO-7), Easley (MO-8), Bonnots Mill (MO-9), Gasconade (MO-10), Washington (MO-11), St. Charles (MO-12), and Halls Ferry (MO-13). Sixteen sites were sampled on

the Mississippi River: Canton (MS-1), Quincy (MS-2), Saverton (MS-3), Clarksville (MS-4), Winfield (MS-5), Alton (MS-6), St. Louis (MS-7), Kimmswick (MS-8), Brickeys (MS-9), Chester (MS-10), Cape Girardeau (MS-11), Commerce (MS-12), Cairo (MS-13), Dorena (MS-14), New Madrid (MS-15), and Cottonwood Point (MS-16). Site localities, collecting dates, and sampling effort are listed in Appendix A.

Fish were collected from the Missouri River between 19 July 1982 and 6 October 1983. Collections were obtained from the Mississippi River between 27 June and 15 September 1983, except for the collection of large fishes at the Chester, Illinois, station. Fish collected between 14 April and 16 October 1981 (Grace and Weithman 1982) were used for this site.

Fish communities were sampled by seining and electro-fishing. Small fishes were collected primarily with a 25 by 8 foot, 1/4 inch (7.6 by 2.4 meter, 6 millimeter) mesh seine to maintain consistency with earlier surveys. Large fishes were collected with a boat-mounted boom shocker with pulsed direct current of 140 to 220 volts, 6 to 12 amps. Large fishes at the Chester site were also captured in hoop, gill, and trammel nets.

Fish were identified using taxonomic keys and species descriptions found in The Fishes of Missouri (Pflieger 1975). Large, readily-identified fishes were measured (total length to the nearest millimeter) and released. All small fishes or random samples were preserved and subsequently sorted and identified in the laboratory. Common and scientific names of

fishes used in this report are those recommended by Robins et al. (1980). A few preserved specimens of selected species were retained at the Fish and Wildlife Research Center, Missouri Department of Conservation. All other preserved specimens were stored at the Ohio State Museum, Columbus, Ohio.

Findings: Ninety-six species of fish were collected from the Missouri and Mississippi rivers. Sixty-eight species were collected from the Missouri River and 84 species from the Mississippi River (Table 1). A total of 91,679 specimens were collected from the two rivers, 36,740 from the Missouri River and 54,939 from the Mississippi River. Three hybrids were collected from the Missouri River: speckled chub x sturgeon chub, sturgeon chub x sicklefin chub, and green sunfish x bluegill. The green sunfish x bluegill hybrid was also collected from the Mississippi River. The species and numbers of fish collected at each site are listed in Appendix B.

No federally listed endangered species (United States Department of the Interior, Fish and Wildlife Service 1976) were collected during the study. However, four species were collected that are listed by Wilson (1984) as rare or endangered in Missouri. Three rare species were collected in the Missouri River: Alabama shad, sturgeon chub, and sicklefin chub. One rare species, Alabama shad, and one endangered species, pallid sturgeon, were collected from the Mississippi River.

The number of species collected at a site varied along each river (Table 2). The fewest species collected on the Missouri River was 28 at Rulo, Nebraska; the greatest was 51 at Easley,

Missouri. The Easley site was seined monthly as part of a separate study of the seasonal usage of sand islands by Missouri River fishes (Grace 1985). This additional collecting contributed to the high number of species collected at this site. The number of species collected along the Mississippi River ranged from 28 at St. Louis, Missouri, to 52 at Chester, Illinois. The extensive collection of large fishes at the Chester site for a previous study of channel regulating structures (Grace and Weithman 1982) contributed to the high number of species. Generally, numbers of species were slightly higher at Mississippi River sites.

Species composition differed between the two rivers. The most abundant species collected from the Missouri River was the plains minnow, which comprised 26.0% of the catch. Other abundant species were: emerald shiner, 17.3%; gizzard shad, 10.1%; channel catfish, 8.2%; silver chub, 5.1%; freshwater drum, 4.6%; river carpsucker, 4.4%; red shiner, 4.2%; and river shiner, 3.3%. Together, these nine species comprised 83.2% of all fish collected from the Missouri River.

The emerald shiner was the most abundant species collected from the Mississippi River, comprising 45.3% of the catch. Other abundant species were: gizzard shad, 14.7%; river shiner, 7.9%; threadfin shad, 5.0%; bluegill, 3.2%; carp, 2.1%; red shiner, 2.1%; bullhead minnow, 1.7%; and white bass, 1.6%. These species comprised 83.6% of all fishes collected from the Mississippi River.

Plans and Recommendations: The data from this study were analyzed and compared to the results of previous surveys of the Missouri and Mississippi rivers. A draft report has been prepared for each river and distributed for review. The report on the Missouri River, entitled "Changes in the Fish Fauna of the Lower Missouri River, 1940-1983," was presented in a symposium on the "Evolutionary and Community Ecology of North American Stream Fishes" held at the 65th Annual Meeting of the American Society of Ichthyologists and Herpetologists, June 9-14, 1985. It will be published in the symposium proceedings. The Mississippi River manuscript, entitled "Changes in the Fish Fauna of the Central Mississippi River, 1936-1983," will be submitted for publication in the future. Twenty-five copies of each publication will be sent to the National Marine Fisheries Service when available.

Data and Reports: Original data and related information are on file at the Fish and Wildlife Research Center, 1110 College Avenue, Columbia, Missouri 65201.

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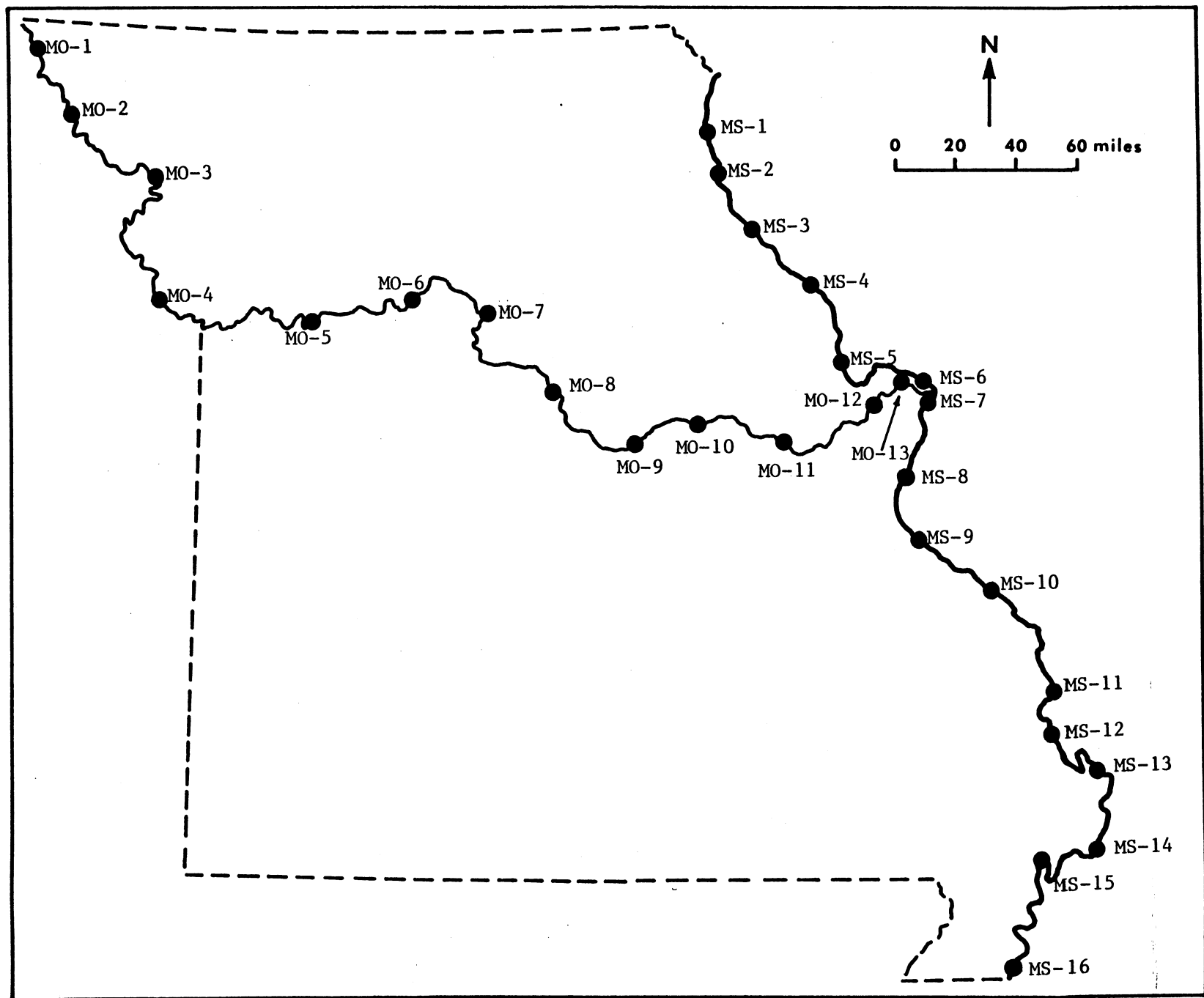


Figure 1. Fish collection sites on the Missouri and Mississippi rivers.

Table 1. Common and scientific names of fishes collected in the Missouri and Mississippi rivers, 1981 to 1983.

	Missouri River	Mississippi River
Lamprey Family - Petromyzontidae		
Chestnut lamprey, <u>Ichthyomyzon castaneus</u> Girard	x	x
Sturgeon Family - Acipenseridae		
Shovelnose sturgeon, <u>Scaphirhynchus platyrhynchus</u> (Rafinesque)	x	x
Pallid sturgeon, <u>Scaphirhynchus albus</u> (Forbes and Richardson)		x
Paddlefish Family - Polyodontidae		
Paddlefish, <u>Polyodon spathula</u> (Walbaum)	x	x
Gar Family - Lepisosteidae		
Shortnose gar, <u>Lepisosteus platostomus</u> Rafinesque	x	x
Spotted gar, <u>Lepisosteus oculatus</u> (Winchell)		x
Longnose gar, <u>Lepisosteus osseus</u> (Linnaeus)	x	x
Bowfin Family - Amidae		
Bowfin, <u>Amia calva</u> Linnaeus		x
Eel Family - Anguillidae		
American eel, <u>Anguilla rostrata</u> (Lesueur)	x	x
Herring Family - Clupeidae		
Skipjack herring, <u>Alosa chrysochloris</u> (Rafinesque)	x	x
Alabama shad, <u>Alosa alabamae</u> Jordan and Evermann	x	x
Gizzard shad, <u>Dorosoma cepedianum</u> (Lesueur)	x	x
Threadfin shad, <u>Dorosoma petenense</u> (Gunther)		x
Mooneye Family - Hiodontidae		
Goldeye, <u>Hiodon alosoides</u> (Rafinesque)	x	x
Mooneye, <u>Hiodon tergisus</u> Lesueur		x
Smelt Family - Osmeridae		
Rainbow smelt, <u>Osmerus mordax</u> (Mitchill)	x	
Pike Family - Esocidae		
Northern pike, <u>Esox lucius</u> Linnaeus		x
Minnow Family - Cyprinidae		
Common carp, <u>Cyprinus carpio</u> Linnaeus	x	x
Grass carp, <u>Ctenopharyngodon idella</u> (Valenciennes)		x
Golden shiner, <u>Notemigonus crysoleucas</u> (Mitchill)	x	x
Silver chub, <u>Hybopsis storeriana</u> (Kirtland)	x	x
Gravel chub, <u>Hybopsis x-punctata</u> Hubbs and Crowe	x	
Speckled chub, <u>Hybopsis aestivalis</u> (Girard)	x	x

Table 1. (continued)

	Missouri River	Mississippi River
Flathead chub, <u>Hybopsis gracilis</u> (Richardson)	x	x
Sturgeon chub, <u>Hybopsis gelida</u> (Girard)	x	
Sicklefin chub, <u>Hybopsis meeki</u> Jordan and Evermann	x	
Suckermouth minnow, <u>Phenacobius mirabilis</u> (Girard)	x	x
Pugnose minnow, <u>Notropis emiliae</u> (Hay)		x
Emerald shiner, <u>Notropis atherinoides</u> Rafinesque	x	x
Rosyface shiner, <u>Notropis rubellus</u> (Agassiz)	x	
Redfin shiner, <u>Notropis umbratilis umbratilis</u> (Girard)	x	
Silverband shiner, <u>Notropis shumardi</u> (Girard)	x	x
Common shiner, <u>Notropis cornutus</u> (Mitchill)	x	
Weed shiner, <u>Notropis texanus</u> (Girard)		x
Spottail shiner, <u>Notropis hudsonius</u> (Clinton)		x
River shiner, <u>Notropis bleinnius</u> (Girard)	x	x
Bigeye shiner, <u>Notropis boops</u> Gilbert	x	
Bigmouth shiner, <u>Notropis dorsalis</u> (Agassiz)	x	x
Spotfin shiner, <u>Notropis spilopterus</u> (Cope)	x	x
Blacktail shiner, <u>Notropis venustus</u> (Girard)		x
Red shiner, <u>Notropis lutrensis</u> (Baird and Girard)	x	x
Sand shiner, <u>Notropis stramineus</u> (Cope)	x	x
Channel mimic shiner, <u>Notropis volucellus wickliffi</u> Trautman	x	x
Ghost shiner, <u>Notropis buehanani</u> Meek	x	x
Brassy minnow, <u>Hybognathus hankinsoni</u> Hubbs	x	
Western silvery minnow, <u>Hybognathus argyritis</u> Girard	x	x
Plains minnow, <u>Hybognathus placitus</u> Girard	x	x
Mississippi silvery minnow, <u>Hybognathus nuchalis</u> Agassiz		x
Bullhead minnow, <u>Pimephales vigilax</u> (Baird and Girard)		x
Bluntnose minnow, <u>Pimephales notatus</u> (Rafinesque)	x	x
Fathead minnow, <u>Pimephales promelas</u> Rafinesque	x	x
Largescale stoneroller, <u>Campostoma oligolepis</u> Hubbs and Greene		x
Sucker Family - Catostomidae		
Blue sucker, <u>Cycleptus elongatus</u> (Lesueur)	x	x
Bigmouth buffalo, <u>Ictiobus cyprinellus</u> (Valenciennes)	x	x
Black buffalo, <u>Ictiobus niger</u> (Rafinesque)	x	x
Smallmouth buffalo, <u>Ictiobus bubalus</u> (Rafinesque)	x	x
River carpsucker, <u>Carpionodes carpio</u> (Rafinesque)	x	x
Quillback, <u>Carpionodes cyprinus</u> (Lesueur)	x	x
Golden redhorse, <u>Moxostoma erythrurum</u> (Rafinesque)		x
Shorthead redhorse, <u>Moxostoma macrolepidotum</u> (Lesueur)	x	x
Catfish Family - Ictaluridae		
Black bullhead, <u>Ictalurus melas</u> (Rafinesque)	x	x
Channel catfish, <u>Ictalurus punctatus</u> (Rafinesque)	x	x
Blue catfish, <u>Ictalurus furcatus</u> (Lesueur)	x	x
Tadpole madtom, <u>Noturus gyrinus</u> (Mitchill)		x
Freckled madtom, <u>Noturus nocturnus</u> Jordan and Gilbert		x

Table 1. (continued)

	Missouri River	Mississippi River
Stonecat, <u>Noturus flavus</u> Rafinesque	x	x
Flathead catfish, <u>Pylodictis olivaris</u> (Rafinesque)	x	x
Killifish Family - Cyprinodontidae		
Blackstripe topminnow, <u>Fundulus notatus</u> (Rafinesque)		x
Livebearer Family - Poeciliidae		
Mosquitofish, <u>Gambusia affinis</u> (Baird and Girard)	x	x
Siverside Family - Atherinidae		
Brook silverside, <u>Labidesthes sicculus</u> (Cope)	x	x
Inland silverside, <u>Menidia beryllina</u> (Cope)		x
Temperate Bass Family - Percichthyidae		
White bass, <u>Morone chrysops</u> (Rafinesque)	x	x
Striped bass, <u>Morone saxatilis</u> (Walbaum)	x	
Yellow bass, <u>Morone mississippiensis</u> Jordan and Eigenmann		x
Sunfish Family - Centrarchidae		
Spotted bass, <u>Micropterus punctulatus</u> (Rafinesque)	x	x
Smallmouth bass, <u>Micropterus dolomieu</u> Lacepede		x
Largemouth bass, <u>Micropterus salmoides</u> (Lacepede)	x	x
Warmouth, <u>Lepomis gulosus</u> (Cuvier)		x
Green sunfish, <u>Lepomis cyanellus</u> Rafinesque	x	x
Orangespotted sunfish, <u>Lepomis humilis</u> (Girard)	x	x
Longear sunfish, <u>Lepomis megalotis</u> (Rafinesque)	x	x
Bluegill, <u>Lepomis macrochirus</u> Rafinesque	x	x
Rock bass, <u>Ambloplites rupestris</u> (Rafinesque)	x	
White crappie, <u>Pomoxis annularis</u> Rafinesque	x	x
Black crappie, <u>Pomoxis nigromaculatus</u> (Lesueur)	x	x
Perch Family - Percidae		
Walleye, <u>Stizostedion vitreum vitreum</u> (Mitchill)	x	x
Sauger, <u>Stizostedion canadense</u> (Smith)	x	x
Slenderhead darter, <u>Percina phoxocephala</u> (Nelson)	x	
Logperch, <u>Percina caprodes</u> (Rafinesque)		x
Ozark logperch, <u>Percina caprodes fulvitaenia</u> Morris and Page	x	
River darter, <u>Percina shumardi</u> (Girard)		x
Western sand darter, <u>Ammocrypta clara</u> Jordan and Meek		x
Johnny darter, <u>Etheostoma nigrum</u> Rafinesque		x
Bluntnose darter, <u>Etheostoma chlorosomum</u> (Hay)		x
Mud darter, <u>Etheostoma asprigene</u> (Forbes)		x

Table 1. (continued)

	Missouri River	Mississippi River
Drum Family - Sciaenidae		
Freshwater drum, <u>Aplodinotus grunniens</u> Rafinesque	x	x
Mullet Family - Mugilidae		
Striped mullet, <u>Mugil cephalus</u> Linnaeus		x
NUMBER OF SPECIES	68	84

Table 2. Numbers of species and specimens collected in the Missouri and Mississippi rivers, 1981 to 1983.

Missouri River			Mississippi River		
Station	Number of species	Number of specimens	Station	Number of species	Number of specimens
Brownville	30	2,416	Canton	30	4,781
Rulo	28	2,553	Quincy	41	4,604
St. Joseph	32	3,020	Saverton	37	5,635
Leavenworth	30	1,740	Clarksville	39	5,378
Lexington	31	887	Winfield	38	3,409
Miami	30	1,756	Alton	38	4,429
Glasgow	33	1,602	St. Louis	28	1,443
Easley	51	18,630	Kimmswick	35	1,847
Bonnots Mill	36	1,062	Brickeys	29	2,765
Gasconade	43	946	Chester	52	7,260
Washington	37	658	Cape Girardeau	34	1,427
St. Charles	29	521	Commerce	40	1,286
Halls Ferry	<u>33</u>	<u>949</u>	Cairo	34	2,123
			Dorena	37	3,377
TOTAL	68	36,740	New Madrid	39	2,499
			Cottonwood Point	<u>46</u>	<u>2,676</u>
			TOTAL	84	54,939

	<u>Number of species</u>	<u>Number of specimens</u>
GRAND TOTAL	96	91,679

Appendix A. Collecting stations on the Missouri and Mississippi rivers.

Missouri River

- MO-1. Brownville, Nebraska, River Mile 542 to 533. Seining: Lower 300 yd of Nishnabotna River at River Mile 542.0L (55 min), upper end of side channel at River Mile 541.8R (50 min), and main channel shoreline between River Miles 542 and 537 (110 min); August 23, 1982. Electrofishing: Lower 300 yd of Nishnabotna River at River Mile 542.0L (35 min), main channel riverbank near River Mile 541.9L (19 min), upper end of side channel at River Mile 541.7R (30 min), dike field near River Mile 539.4R (45 min), lower 300 yd of Honey Creek at River Mile 538.3R (25 min), and dike fields near River Mile 533L and R (50 min); July 20, 1982.
- MO-2. Rulo, Nebraska, River Mile 506 to 499.5. Seining: Main channel shoreline between River Miles 504.5 and 499.5 (180 min); August 23, 1982. Electrofishing: Revetment between River Miles 506R and 505.6R (35 min), main channel riverbank between River Miles 506L and 504.4L (75 min), revetment between River Miles 505.5R and 504.3R (50 min), dike field near River Mile 504.3R (30 min), dike field near River Mile 502.5L (35 min), and lower 400 yd of Winnebago Creek at River Mile 501.0R (30 min); July 21, 1982.

Appendix A. (continued)

- MO-3. St. Joseph, Missouri, River Mile 458 to 451.7. Seining: Main channel shoreline between River Miles 458 and 455.3 (163 min); August 24, 1982. Electrofishing: Revetment at River Mile 453.8L (20 min), lower 100 yd of Mace Creek at River Mile 453.7L (35 min), and dike field near River Mile 451.7L (17 min); July 19, 1982. Dike field near River Mile 454.9R (60 min); July 22, 1982.
- MO-4. Leavenworth, Kansas, River Mile 394.5 to 388. Seining: Main channel shoreline between River Miles 394.5 and 391 (195 min); August 24, 1982. Electrofishing: Lower end of drainage ditch (riverward of levee crossing) at River Mile 391.9L (9 min), dike fields between River Miles 390 and 388L and R (40 min), and lower 175 yd of Sevenmile Creek at River Mile 388.1R (20 min); October 13, 1982.
- MO-5. Lexington, Missouri, River Mile 324.1 to 313.6. Seining: Main channel shoreline between River Miles 324.1 and 319.7 (270 min); August 25, 1982. Electrofishing: Dike field near River Mile 319.5L (60 min), dike field near River Mile 317.5R (50 min), and lower 200 yd of channelized Crooked River at River Mile 313.6L (40 min); September 14, 1982.

Appendix A. (continued)

- M0-6. Miami, Missouri, River Mile 271 to 262. Seining:
Main channel shoreline near River Mile 262 (80 min)
and slough at River Mile 262L (15 min); August 25, 1982.
Electrofishing: Main channel riverbank near River Mile
271R (65 min), side channel at River Mile 270.4R (25 min),
lower 200 yd of Wakenda Creek at River Mile 262.8L
(25 min), and slough at River Mile 262L (60 min);
September 15, 1982.
- M0-7. Glasgow, Missouri, River Mile 231.8 to 221.5. Seining:
Sand island near River Mile 228R (90 min); August 26,
1982. Main channel shoreline between River Miles 230.5
and 229 and main channel shoreline between River Miles
226.8 and 225.7; October 29, 1982. Electrofishing: Lower
200 yd of Little Chariton River at River Mile 227.2L, dike
field near River Mile 222.5L, and dike field near River
Mile 221.5R (60 min); September 13, 1982. Main channel
riverbank near River Mile 231.8L and R (60 min), lower 100
yd of Little Chariton River at River Mile 227.2L (25 min),
and lower 200 yd of Bear Creek at River Mile 227.0L (25
min); September 16, 1982.
- M0-8. Easley, Missouri, River Mile 177.3 to 169.9. Seining:
Sand island at River Mile 177.3L (449.7 min); July 29,
September 10 and 30, November 11, December 20, 1982,
February 2, March 23, June 15, July 19, August 23, and

Appendix A. (continued)

October 6, 1983. Sand island at River Mile 169.9R (244.7 min); July 29, September 10 and 30, November 10, December 23, 1982, July 19, August 22, and October 6, 1983.

Electrofishing: Dike field at River Mile 172.0R (40 min), dike field at River Mile 171.3R (20 min), and lower 100 yd of Perche Creek at River Mile 170.6L (35 min); October 21, 1982. Dike field between River Miles 172.1L and 171.6L (90 min) and dike field between River Miles 171.8R and 171.1R (60 min); October 25, 1982. Side channel at River Mile 169.9R (40 min); October 26, 1982.

M0-9. Bonnots Mill, Missouri, River Mile 130 to 124. Seining: Sand island at River Mile 129.5L (190 min); September 23, 1982. Main channel shoreline near River Mile 130 (75 min); September 29, 1982. Electrofishing: Lower 300 yd of Osage River at River Mile 130.0R (55 min); October 11, 1982. Dike field near River Mile 125.5R (15 min) and upper end of side channel (St. Aubert Chute) at River Mile 124R (70 min); October 12, 1982.

M0-10. Gasconade, Missouri, River Mile 108.5 to 100.7. Seining: Sand island, side channel, and main channel shoreline between River Miles 104.4 and 100.7 (243 min); September 24, 1982. Electrofishing: Dike fields near River Mile 108.5L and R, dike field near River Mile 106.5R (30 min), and lower 350 yd of Gasconade River at River Mile 104.4R (65 min); October 11, 1982.

Appendix A. (continued)

MO-11. Washington, Missouri, River Mile 77.8 to 69.5. Seining: Sand island/bar near River Mile 76 (140 min) and slough between River Miles 76.5 and 75 (45 min); September 28, 1982. Electrofishing: Lower 200 yd of Boeuf Creek at River Mile 77.8R (30 min), slough at River Mile 75L (30 min), main channel riverbank near River Mile 74.5L (20 min), and dike field near River Mile 69.5L (40 min); October 6, 1982.

MO-12. St. Charles, Missouri, River Mile 34.5 to 31. Seining: Sand island/bar at River Mile 33.5R (45 min) and main channel shoreline at River Mile 31L (70 min); September 28, 1982. Electrofishing: Dike field near River Mile 34.5R (50 min), upper end of side channel at River Mile 33.5R (30 min), and landward of revetment at River Mile 32.0L (60 min); October 5, 1982.

MO-13. Halls Ferry, Missouri, River Mile 16.3 to 10.6. Seining: Sandbar near River Mile 16R (75 min), main channel riverbank near River Mile 16R (55 min), and upper and lower end of side channel (Car of Commerce Chute) at River Miles 16.3R and 10.6R, respectively (120 min); September 27, 1982. Electrofishing: Dike field near River Mile 11L (45 min) and lower end of side channel (Car of Commerce Chute) at River Mile 10.6R (70 min); October 4, 1982. Upper end

Appendix A. (continued)

of side channel (Car of Commerce Chute) at River Mile 16.3R (55 min); October 5, 1982.

Mississippi River

- MS-1. Canton, Missouri, River Mile 343 to 341.2. Seining: Shoal and island below Lock and Dam No. 20 near River Mile 343L, main channel shoreline near River Mile 342R, and upper end of side channel (Canton Chute) near River Mile 342L (265 min); August 9, 1983. Electrofishing: Revetment between River Miles 342.9R and 342.2R (60 min), upper end of side channel (Canton Chute) near River Mile 342L (25 min), and upper end of side channel (Barns Island Chute) near River Mile 341.2L (20 min); June 27, 1983. Lower 100 yd of unnamed tributary at River Mile 343.0R (30 min); June 28, 1983.
- MS-2. Quincy, Illinois, River Mile 324.9 to 321.3. Seining: Along spillway and in nearby slough above Lock and Dam No. 21 at River Mile 324.9R (70 min) and main channel shoreline near River Mile 324.5R (97 min); August 10, 1983. Electrofishing: Below spillway of Lock and Dam No. 21 at River Mile 324.8R (75 min), main channel shoreline at River Mile 323.5R (20 min), side channel (adjacent to Orton Island) from River Mile 323.5R to 323.2R (40 min), lower 100 yd of Fabius River Diversion at River Mile

Appendix A. (continued)

323.2R (35 min), and lower end of side channel (Texas Chute) at River Mile 321.3L (45 min); July 6, 1983.

MS-3. Saverton, Missouri, River Mile 301.2 to 296.3. Seining: Shoreline of navigation pool above spillway of Lock and Dam No. 22 at River Mile 301.2L (55 min), slough below lock and dam at River Mile 301.1L (40 min), and main channel shoreline near River Mile 300.5L and R (65 min); August 10, 1983. Electrofishing: Below spillway of Lock and Dam No. 22 at River Mile 301.2L (32 min), revetment at River Mile 300.9R (15 min), lower 50 yd of unnamed tributary at River Mile 300R (10 min), slough on Taylor Island at River Mile 299.5L (50 min), and main channel shoreline between River Miles 298.0R and 296.3R (60 min); July 7, 1983.

MS-4. Clarksville, Missouri, River Mile 273.4 to 273. Seining: Shoreline of navigation pool above spillway of Lock and Dam No. 24 and two ponds below spillway at River Mile 273.4L (95 min), main channel shoreline near River Mile 273.2L (43 min), and side channel (adjacent to Clarksville Island) near River Mile 273L (40 min); August 11, 1983. Electrofishing: Below spillway of Lock and Dam No. 24 at River Mile 273.4L (36 min), main channel shoreline at River Mile 273.2R (40 min), main channel shoreline between River Miles 273.2L and 273.0L (30 min), and lower 150 yd

Appendix A. (continued)

of drainage ditch near River Mile 273L (49 min); July 8, 1983.

MS-5. Winfield, Missouri, River Mile 241.5 to 238. Seining: Shoreline of navigation pool above spillway of Lock and Dam No. 25 and slough below spillway near River Mile 241.5L (85 min), lower end of side channel (Sandy Chute) near River Mile 241.5R (40 min), and main channel shoreline near River Mile 240.7L (107 min); September 6, 1983. Electrofishing: Below spillway of Lock and Dam No. 25 at River Mile 241.5L (75 min), lower end of side channel (Sandy Chute) at River Mile 241.3R (32 min), main channel shoreline between River Miles 240.5L and 240.2L (51 min), and lower 100 yd of Bobs Creek at River Mile 238.0R (22 min); July 12, 1983.

MS-6. Alton, Illinois, River Mile 202 to 199.2. Seining: Main channel shoreline below Lock and Dam No. 26 near River Mile 202R (62 min) and side channel (adjacent to Maple Island) near River Mile 200R (45 min); September 7, 1983. Electrofishing: Main channel shoreline below Lock and Dam No. 26 near River Mile 201.4R (32 min) and upper end of side channel (adjacent to Maple Island) at River Mile 200.5R (64 min); July 13, 1983. Revetment between River Miles 200.8L and 200.0L (47 min) and lower end of side channel (adjacent to Maple Island) at River Mile 199.2R (29 min); July 14, 1983.

Appendix A. (continued)

- MS-7. St. Louis, Missouri, River Mile 194 to 191.2. Seining:
Main channel shoreline below mouth of Missouri River near
River Mile 195R (113 min); September 7, 1983.
Electrofishing: Lower 100 yd of Watkins Creek at River
Mile 191.2R (13 min); July 14, 1983.
- MS-8. Kimmswick, Missouri, River Mile 163.9 to 160. Seining:
Main channel shoreline near River Mile 160 (180 min);
September 8, 1983. Electrofishing: Dike field between
River Miles 163.9L and 163.3L (55 min), revetment between
River Miles 161.4R and 160.7R (46 min), side channel
between River Miles 161.3L and 160.5L (44 min), and lower
200 yd of Meramec River at River Mile 160.6R (94 min);
July 15, 1983.
- MS-9. Brickeys, Missouri, River Mile 140.4 to 136.8. Seining:
Main channel shoreline and upper end of side channel near
River Mile 139 (195 min); September 8, 1983.
Electrofishing: Revetment between River Miles 140.4R and
139.8R (20 min), dike field between River Miles 140L and
139L (38 min), upper end of side channel at River Mile
139.4L (55 min), lower 50 yd of Isle Du Bois Creek at
River Mile 139.3R (8 min), and lower end of side channel
at River Mile 136.8L (26 min); August 3, 1983.

Appendix A. (continued)

MS-10. Chester, Illinois, River Mile 115 to 98. Seining: Main channel shoreline near River Mile 113 (160 min); September 9, 1983. Electrofishing, hoop netting, gill netting, and trammel netting: Dikes 114.0L, 113.9L, 113.5L, 103.3R, 103.2L, 102.2L, 100.1R, and 98.9R between River Miles 115 and 98; April 14 to October 16, 1981.

MS-11. Cape Girardeau, Missouri, River Mile 69 to 57. Seining: Main channel shoreline near River Mile 59 (160 min); September 9, 1983. Electrofishing: Lower 100 yd of Indian Creek at River Mile 69.0R (21 min), dike fields and revetment between River Miles 67.8 and 65.5L and R (50 min), and lower end of side channel between River Miles 58R and 57R (44 min); August 4, 1983.

MS-12. Commerce, Missouri, River Mile 44 to 35. Seining: Main channel shoreline near River Mile 44R (15 min), main channel shoreline near River Mile 43R (108 min), and main channel shoreline near River Mile 41L (103 min); August 19, 1983. Electrofishing: Irregular shoreline of natural rock island at River Mile 43.4R (66 min), dike field at River Mile 42.7L (25 min), main channel shoreline of natural rock at River Mile 40.5R (18 min), and lower end of side channel (Santa Fe Chute) at River Mile 35.0L (15 min); September 15, 1983.

Appendix A. (continued)

MS-13. Cairo, Illinois, River Mile 4 to 0 (above mouth of Ohio River) and 953.8 to 948.3 (below mouth of Ohio River).

Seining: Main channel shoreline near River Mile 1L and R (85 min), main channel shoreline near River Mile 953.5L (49 min), and main channel shoreline near River Mile 952R (82 min); August 18, 1983. Electrofishing: Upper end of side channel (adjacent to Angelo Towhead) at River Mile 4.0L (31 min), lower 250 yd of Ohio River at River Mile 0L (17 min), dike field at River Mile 0R (30 min), lower 75 yd of unnamed tributary at River Mile 952.0L (12 min), and dike field at River Mile 948.3L (34 min); July 29, 1983.

MS-14. Dorena, Missouri, River Mile 925.8 to 921.7. Seining:

Backwater landward of sand peninsula near River Mile 924R (100 min) and main channel shoreline near River Mile 924R (125 min); August 17, 1983. Electrofishing: Side channel at River Mile 925.8R (32 min), main channel riverbank at River Mile 924.8L (23 min), revetment between River Miles 924R and 923R (40 min), bayou-like area at confluence of Bayou du Chien and Obion Creek near River Mile 923L (63 min), and lower 500 yd of Obion Creek at River Mile 921.7L (52 min); July 27, 1983.

MS-15. New Madrid, Missouri, River Mile 890 to 888. Seining:

Main channel shoreline between River Miles 890 and 888 (113 min) and lower end of St. Johns Bayou (riverward of levee crossing) at River Mile 889.6R (40 min); July 28,

Appendix A. (continued)

1983. Main channel shoreline near River Mile 889 (195 min); August 16, 1983. Electrofishing: Revetment between River Miles 890.0R and 889.6R (30 min), lower 350 yd of St. Johns Bayou at River Mile 889.6R (60 min), dike field at River Mile 888L (34 min), and side channel (adjacent to Madrid Bar) at River Mile 888R (28 min); July 28, 1983.

MS-16. Cottonwood Point, Missouri, River Mile 837 to 828.9.

Seining: Upper end of side channel (Everett Lake, high closing structure at upper end) near River Mile 837L (36 min), lower end of side channel (Everett Lake) near River Mile 832.5L (35 min), and main channel shoreline near River Mile 832L and R (165 min); July 26, 1983.

Electrofishing: Upper end of side channel (Everett Lake) near River Mile 837L (35 min), main channel riverbank between River Miles 833.8L and 833.5L (33 min), revetment between River Miles 833.7R and 832.8R (30 min), lower 300 yd of side channel (Everett Lake) at River Mile 832.3L (30 min), and dike field at River Mile 828.9L (23 min); July 26, 1983.

Appendix B.

Table 1. Species and numbers of specimens collected in the Missouri River at the Brownville station (MO-1).

Species	Seining	Electrofishing	Total
Shortnose gar	2	9	11
Longnose gar		2	2
American eel		1	1
Gizzard shad	108	2	110
Goldeye		4	4
Common carp		49	49
Silver chub	37		37
Speckled chub	6		6
Flathead chub	55		55
Emerald shiner	594		594
River shiner	443		443
Red shiner	234		234
Sand shiner	45		45
Western silvery minnow	43		43
Plains minnow	533		533
Fathead minnow	50		50
Bigmouth buffalo		3	3
River carpsucker	8	19	27
Shorthead redhorse	1		1
Channel catfish	100	3	103
Flathead catfish	1	6	7
White bass	10		10
Largemouth bass		1	1
Green sunfish	4		4
Orangespotted sunfish		1	1
Bluegill	12	3	15
White crappie		3	3
Black crappie		1	1
Sauger	3	1	4
Freshwater drum	12	7	19
Number of specimens	2,301	115	2,416
Number of species	21	17	30

Appendix B. (continued)

Table 2. Species and numbers of specimens collected in the Missouri River at the Rulo station (MO-2).

Species	Seining	Electrofishing	Total
Shortnose gar	1	15	16
Longnose gar		2	2
American eel		1	1
Gizzard shad	52	6	58
Goldeye	6	8	14
Common carp	1	18	19
Silver chub	16		16
Speckled chub	3		3
Flathead chub	17		17
Suckermouth minnow	1		1
Emerald shiner	897		897
River shiner	207		207
Red shiner	171		171
Sand shiner	8		8
Western silvery minnow	8		8
Plains minnow	883		883
Fathead minnow	33		33
Bigmouth buffalo		2	2
Smallmouth buffalo		1	1
Buffalofish species	1		1
River carpsucker	1	2	3
Channel catfish	83	2	85
Flathead catfish		14	14
Green sunfish	1		1
Bluegill	51	1	52
White crappie	6	1	7
Black crappie		3	3
Sauger		3	3
Freshwater drum	21	6	27
Number of specimens	2,468	85	2,553
Number of species	21	16	28

Appendix B. (continued)

Table 3. Species and numbers of specimens collected in the Missouri River at the St. Joseph station (MO-3).

Species	Seining	Electrofishing	Total
Shovelnose sturgeon		1	1
Shortnose gar	8	8	16
Gizzard shad	33	31	64
Goldeye	1	3	4
Rainbow smelt	3		3
Common carp	3	24	27
Golden shiner	1		1
Silver chub	42		42
Flathead chub	22		22
Sicklefin chub	3		3
Suckermouth minnow	2		2
Emerald shiner	762	1	763
River shiner	210		210
Bigmouth shiner	1		1
Red shiner	142		142
Sand shiner	10		10
Plains minnow	1,276		1,276
Brassy minnow	1		1
Fathead minnow	31		31
Minnow species	27		27
Bigmouth buffalo		2	2
River carpsucker	5	13	18
Channel catfish	159	2	161
Stonecat	1		1
Flathead catfish	4	4	8
White bass	7	1	8
Largemouth bass		4	4
Green sunfish	6		6
Bluegill	27	5	32
White crappie	24		24
Black crappie		1	1
Green sunfish x Bluegill		1	1
Sauger	1	2	3
Freshwater drum	97	8	105
Number of specimens	2,909	111	3,020
Number of species	28	16	32

Appendix B. (continued)

Table 4. Species and numbers of specimens collected in the Missouri River at the Leavenworth station (MO-4).

Species	Seining	Electrofishing	Total
Shortnose gar	2	5	7
Longnose gar		1	1
Gizzard shad	8	34	42
Goldeye	1	3	4
Rainbow smelt	1		1
Common carp	1	6	7
Silver chub	38		38
Speckled chub	3		3
Flathead chub	16		16
Sturgeon chub	1		1
Emerald shiner	587		587
River shiner	106		106
Red shiner	24		24
Sand shiner	2		2
Western silvery minnow	7		7
Plains minnow	429		429
Brassy minnow	1		1
Fathead minnow	6		6
Bigmouth buffalo		2	2
River carpsucker	20	23	43
Channel catfish	192		192
Blue catfish	1		1
Mosquitofish	2		2
White bass		2	2
Green sunfish	5		5
Orangespotted sunfish	1		1
Bluegill	8	2	10
Black crappie		1	1
Sauger	2		2
Freshwater drum	184	13	197
Number of specimens	1,648	92	1,740
Number of species	26	11	30

Appendix B. (continued)

Table 5. Species and numbers of specimens collected in the Missouri River at the Lexington station (MO-5).

Species	Seining	Electrofishing	Total
Shortnose gar	5	3	8
Longnose gar		1	1
Gizzard shad	116	31	147
Goldeye	1		1
Common carp	1	35	36
Silver chub	45		45
Speckled chub	11		11
Suckermouth minnow	1		1
Emerald shiner	190		190
River shiner	24		24
Red shiner	24		24
Sand shiner	1		1
Western silvery minnow	3		3
Plains minnow	41		41
Fathead minnow	1		1
Minnow species	104		104
Bigmouth buffalo		1	1
Smallmouth buffalo		1	1
River carpsucker		5	5
Channel catfish	118	1	119
Blue catfish	4		4
Flathead catfish	1	1	2
Mosquitofish	17		17
White bass	3	14	17
Striped bass		1	1
Largemouth bass		2	2
Green sunfish	2		2
Bluegill	22	2	24
White crappie	4	8	12
Black crappie	1		1
Sauger	1	1	2
Freshwater drum	38	1	39
Number of specimens	779	108	887
Number of species	25	16	31 ^a

^a A fisherman's catch included two additional species: grass carp and black buffalo.

Appendix B. (continued)

Table 6. Species and numbers of specimens collected in the Missouri River at the Miami station (MO-6).

Species	Seining	Electrofishing	Total
Chestnut lamprey		1	1
Shortnose gar		6	6
Longnose gar		2	2
Gizzard shad	34	65	99
Goldeye	2	1	3
Common carp	8	33	41
Golden shiner	1		1
Silver chub	112		112
Speckled chub	10		10
Flathead chub	5		5
Sicklefin chub	2		2
Emerald shiner	344		344
River shiner	87		87
Red shiner	6		6
Sand shiner	2		2
Western silvery minnow	187		187
Plains minnow	570		570
Fathead minnow	16		16
River carpsucker	10	3	13
Shorthead redhorse		1	1
Channel catfish	139	2	141
Blue catfish	3		3
Flathead catfish	1	4	5
Mosquitofish	3		3
White bass	7	9	16
Green sunfish	6		6
Bluegill	31		31
White crappie		1	1
Sauger	1		1
Freshwater drum	32	9	41
Number of specimens	1,619	137	1,756
Number of species	25	13	30

Appendix B. (continued)

Table 7. Species and numbers of specimens collected in the Missouri River at the Glasgow station (MO-7).

Species	Seining	Electrofishing	Total
Shortnose gar		15	15
Longnose gar		4	4
Gizzard shad	25	19	44
Goldeye		1	1
Rainbow smelt	4		4
Common carp		29	29
Silver chub	15		15
Speckled chub	17		17
Flathead chub	11		11
Sturgeon chub	7		7
Sicklefin chub	8		8
Emerald shiner	142		142
River shiner	21		21
Bigmouth shiner	5		5
Red shiner	50		50
Sand shiner	6		6
Western silvery minnow	89		89
Plains minnow	834		834
Bluntnose minnow	1		1
Fathead minnow	2		2
Blue sucker	1		1
Bigmouth buffalo		1	1
Black buffalo		2	2
River carpsucker	47	7	54
Sucker species	8		8
Channel catfish	177		177
Blue catfish	2	4	6
Flathead catfish	1	1	2
White bass		3	3
Green sunfish	1	2	3
Bluegill	2	1	3
White crappie	1	5	6
Sauger	1		1
Freshwater drum	15	15	30
Number of specimens	1,493	109	1,602
Number of species	26	15	33

Appendix B. (continued)

Table 8. Species and numbers of specimens collected in the Missouri River at the Easley station (MO-8).

Species	Seining	Electrofishing	Total
Chestnut lamprey		5	5
Paddlefish		2	2
Shortnose gar	14	1	15
Longnose gar	1		1
Gizzard shad	2,745	52	2,797
Herring (<u>Alosa</u> sp.)	1		1
Goldeye	122	12	134
Rainbow smelt	490		490
Common carp	91	11	102
Golden shiner	1		1
Silver chub	1,455		1,455
Speckled chub	493		493
Flathead chub	76		76
Sturgeon chub	284		284
Sicklefin chub	279		279
Suckermouth minnow	1		1
Emerald shiner	2,513		2,513
Rosyface shiner	1		1
Redfin shiner	8		8
Silverband shiner	3		3
Common shiner	1		1
River shiner	81		81
Bigmouth shiner	20		20
Red shiner	516		516
Sand shiner	22		22
Ghost shiner	13		13
Brassy minnow	17		17
Western silvery minnow	343		343
Plains minnow	4,421		4,421
Silvery minnow species	1		1
Bluntnose minnow	17		17
Fathead minnow	14		14
Stoneroller species	1		1
Minnow species	3		3
Speckled chub x Sturgeon chub	1		1
Sturgeon chub x Sicklefin chub	1		1
Blue sucker	4		4
Bigmouth buffalo	1	4	5
Black buffalo		1	1
Buffalofish species	3		3
Quillback	2		2
River carpsucker	1,373	7	1,380
Carpsucker species	167		167
Shorthead redhorse		5	5
Sucker species	2		2
Black bullhead	5		5

Appendix B. (continued)

Table 8. (continued)

Species	Seining	Electrofishing	Total
Channel catfish	1,433	21	1,454
Blue catfish	3		3
Flathead catfish	3	3	6
Mosquitofish	1		1
White bass	165		165
Striped bass	2		2
Spotted bass	1		1
Green sunfish	16		16
Bluegill	19		19
White crappie	7	38	45
Black crappie		2	2
Walleye	2		2
Sauger	32	3	35
Freshwater drum	1,082	72	1,154
Larval fish	18		18
Number of specimens	18,391	239	18,630
Number of species	46	16	51

Appendix B. (continued)

Table 9. Species and numbers of specimens collected in the Missouri River at the Bonnots Mill station (MO-9).

Species	Seining	Electrofishing	Total
Chestnut lamprey	1	9	10
Shortnose gar		5	5
American eel		1	1
Gizzard shad	16	41	57
Goldeye	3	4	7
Common carp		8	8
Silver chub	39		39
Speckled chub	94		94
Flathead chub	3		3
Sturgeon chub	28		28
Sicklefin chub	75		75
Emerald shiner	85		85
River shiner	11		11
Red shiner	103		103
Sand shiner	7		7
Ghost shiner	2		2
Western silvery minnow	46		46
Plains minnow	193		193
Bluntnose minnow	8		8
Bigmouth buffalo		1	1
Smallmouth buffalo		2	2
River carpsucker	9	7	16
Quillback		1	1
Shorthead redhorse		3	3
Channel catfish	204	2	206
Mosquitofish	1		1
White bass		3	3
Spotted bass		9	9
Largemouth bass		2	2
Green sunfish		1	1
Orangespotted sunfish	2		2
Bluegill	1	10	11
White crappie		2	2
Sauger		2	2
Ozark logperch	1		1
Freshwater drum	7	10	17
Number of specimens	939	123	1,062
Number of species	23	20	36

Appendix B. (continued)

Table 10. Species and numbers of specimens collected in the Missouri River at the Gasconade station (MO-10).

Species	Seining	Electrofishing	Total
Chestnut lamprey	3	4	7
Shortnose gar		8	8
Longnose gar		10	10
American eel		1	1
Gizzard shad	13	59	72
Goldeye	10	2	12
Common carp		6	6
Silver chub	39		39
Gravel chub	1		1
Speckled chub	167		167
Sturgeon chub	9		9
Sicklefin chub	50		50
Emerald shiner	122		122
River shiner	8		8
Spotfin shiner	1		1
Red shiner	41		41
Sand shiner	2		2
Ghost shiner	32		32
Western silvery minnow	4		4
Plains minnow	47		47
Bluntnose minnow	12		12
Fathead minnow	1		1
Bigmouth buffalo		2	2
River carpsucker	3	13	16
Shorthead redhorse	1		1
Channel catfish	133	3	136
Blue catfish	1	2	3
Flathead catfish	1	1	2
Mosquitofish	4		4
Brook silverside	2		2
White bass		1	1
Spotted bass		8	8
Largemouth bass		1	1
Green sunfish	2		2
Longear sunfish		1	1
Bluegill	36	20	56
Rock bass		1	1
White crappie	3	5	8
Black crappie	2	3	5
Sauger		6	6
Slenderhead darter	1		1
Ozark logperch	1		1
Freshwater drum	15	22	37
Number of specimens	767	179	946
Number of species	32	22	43

Appendix B. (continued)

Table 11. Species and numbers of specimens collected in the Missouri River at the Washington station (MO-11).

Species	Seining	Electrofishing	Total
Chestnut lamprey		21	21
Shovelnose sturgeon	1		1
Shortnose gar	1	9	10
Longnose gar		1	1
Skipjack herring		1	1
Alabama shad	2		2
Gizzard shad	17	61	78
Goldeye	1		1
Common carp		8	8
Silver chub	18		18
Speckled chub	78		78
Flathead chub	5		5
Sturgeon chub	9		9
Sicklefin chub	47		47
Emerald shiner	30		30
River shiner	1		1
Bigeye shiner	12		12
Red shiner	135		135
Sand shiner	9		9
Channel mimic shiner	2		2
Ghost shiner	4		4
Western silvery minnow	1		1
Plains minnow	24		24
Bluntnose minnow	3		3
Bigmouth buffalo		2	2
Smallmouth buffalo		1	1
River carpsucker	3	10	13
Shorthead redhorse	3		3
Channel catfish	101	11	112
Flathead catfish	1		1
White bass	1	1	2
Largemouth bass		1	1
Bluegill	5	1	6
White crappie		4	4
Black crappie	1	1	2
Sauger	1		1
Freshwater drum	6	3	9
Number of specimens	522	136	658
Number of species	29	16	37

Appendix B. (continued)

Table 12. Species and numbers of specimens collected in the Missouri River at the St. Charles station (MO-12).

Species	Seining	Electrofishing	Total
Chestnut lamprey		13	13
Shortnose gar		6	6
American eel		2	2
Gizzard shad	7	45	52
Goldeye		1	1
Common carp		38	38
Silver chub	4		4
Speckled chub	29		29
Flathead chub	5		5
Sicklefin chub	26		26
Emerald shiner	21		21
River shiner	5		5
Red shiner	27		27
Sand shiner	6		6
Channel mimic shiner	1		1
Ghost shiner	16		16
Western silvery minnow	1		1
Plains minnow	179		179
Bigmouth buffalo		1	1
Black buffalo		1	1
Smallmouth buffalo		1	1
Buffalofish species	1		1
River carpsucker		4	4
Channel catfish	40	17	57
Flathead catfish		4	4
White bass		1	1
Bluegill	7	2	9
White crappie	2	3	5
Sauger		2	2
Freshwater drum	3		3
Number of specimens	380	141	521
Number of species	17	16	29

Appendix B. (continued)

Table 13. Species and numbers of specimens collected in the Missouri River at the Halls Ferry station (MO-13).

Species	Seining	Electrofishing	Total
Chestnut lamprey		7	7
Shovelnose sturgeon	2		2
Shortnose gar	1	7	8
Gizzard shad	14	74	88
Goldeye		2	2
Common carp		47	47
Silver chub	27		27
Speckled chub	85		85
Flathead chub	24		24
Sturgeon chub	38		38
Sicklefin chub	100		100
Emerald shiner	74		74
Silverband shiner	1		1
Red shiner	86		86
Sand shiner	2		2
Channel mimic shiner	20		20
Ghost shiner	54		54
Plains minnow	125		125
Bluntnose minnow	1		1
Bigmouth buffalo		5	5
Smallmouth buffalo		2	2
River carpsucker		27	27
Shorthead redhorse	2	1	3
Channel catfish	65	20	85
Blue catfish	1	5	6
Stonecat	2		2
Flathead catfish	3	3	6
Mosquitofish	2		2
Spotted bass		1	1
Green sunfish	1		1
Bluegill	2		2
Slenderhead darter	3		3
Freshwater drum	5	8	13
Number of specimens	740	209	949
Number of species	26	14	33

Appendix B. (continued)

Table 14. Species and numbers of specimens collected in the Mississippi River at the Canton station (MS-1).

Species	Seining	Electrofishing	Total
Shortnose gar		1	1
Longnose gar	5		5
Skipjack herring	1		1
Gizzard shad	416	269	685
Common carp	1	92	93
Silver chub	16		16
Emerald shiner	3,688		3,688
Spottail shiner	1		1
River shiner	69		69
Spotfin shiner	1		1
Red shiner	19		19
Sand shiner	5		5
Bullhead minnow	4		4
Bluntnose minnow	2		2
Smallmouth buffalo		5	5
Quillback	4		4
River carpsucker	1	24	25
Carp sucker species	1		1
Channel catfish	1	1	2
Stonecat	2		2
Flathead catfish		4	4
Mosquitofish	15		15
White bass	17	38	55
Largemouth bass		5	5
Green sunfish		1	1
Bluegill	1	2	3
White crappie		21	21
Black crappie		5	5
Green sunfish x Bluegill		1	1
Sauger		3	3
River darter	4		4
Freshwater drum	16	19	35
Number of specimens	4,290	491	4,781
Number of species	22	15	30

Appendix B. (continued)

Table 15. Species and numbers of specimens collected in the Mississippi River at the Quincy station (MS-2).

Species	Seining	Electrofishing	Total
Shovelnose sturgeon		1	1
Shortnose gar	1		1
Longnose gar		9	9
Gizzard shad	171	86	257
Threadfin shad		1	1
Herring species	1		1
Mooneye	1		1
Northern pike		2	2
Common carp		32	32
Silver chub	149		149
Speckled chub	2		2
Suckermouth minnow	9		9
Emerald shiner	3,412		3,412
Spottail shiner	12		12
River shiner	76		76
Spotfin shiner	3		3
Red shiner	107		107
Sand shiner	13		13
Bullhead minnow	62		62
Bluntnose minnow	2		2
Blue sucker		1	1
Smallmouth buffalo	1	4	5
Quillback	2	1	3
River carpsucker	1	2	3
Golden redhorse		1	1
Shorthead redhorse		2	2
Channel catfish	6	3	9
Flathead catfish	1	5	6
Mosquitofish	5		5
Brook silverside	2		2
White bass	22	34	56
Smallmouth bass	1		1
Largemouth bass	2	8	10
Green sunfish		1	1
Bluegill	222	26	248
Sunfish (<u>Lepomis</u> sp.)	55		55
White crappie	1	8	9
Black crappie		3	3
Walleye	1		1
Sauger	2	8	10
River darter	2		2
Johnny darter	1		1
Freshwater drum	7	11	18
Number of specimens	4,355	249	4,604
Number of species	31	22	41

Appendix B. (continued)

Table 16. Species and numbers of specimens collected in the Mississippi River at the Saverton station (MS-3).

Species	Seining	Electrofishing	Total
Longnose gar		9	9
American eel		2	2
Gizzard shad	174	42	216
Common carp		30	30
Silver chub	25		25
Speckled chub	2		2
Suckermouth minnow	9		9
Emerald shiner	4,629		4,629
River shiner	49		49
Bigmouth shiner	1		1
Spotfin shiner	6		6
Red shiner	37		37
Sand shiner	29		29
Bullhead minnow	33		33
Bluntnose minnow	2		2
Bigmouth buffalo		3	3
Smallmouth buffalo	2	4	6
River carpsucker		8	8
Shorthead redhorse		1	1
Channel catfish		2	2
Flathead catfish		5	5
Mosquitofish	173		173
Brook silverside	2		2
White bass	8	14	22
Largemouth bass	1	2	3
Warmouth	4		4
Green sunfish		16	16
Orangespotted sunfish	15		15
Bluegill	142	5	147
Sunfish (<u>Lepomis</u> sp.)	45		45
White crappie	8	4	12
Black crappie	8	5	13
Walleye		2	2
Sauger		12	12
Northern logperch	1		1
Western sand darter	3		3
Johnny darter	12		12
Freshwater drum	20	29	49
Number of specimens	5,440	195	5,635
Number of species	26	19	37

Appendix B. (continued)

Table 17. Species and numbers of specimens collected in the Mississippi River at the Clarksville station (MS-4).

Species	Seining	Electrofishing	Total
Paddlefish	1		1
Shortnose gar	8	10	18
Longnose gar	9	5	14
American eel		3	3
Gizzard shad	394	79	473
Threadfin shad	19		19
Common carp	3	30	33
Golden shiner	2		2
Silver chub	33		33
Suckermouth minnow	10		10
Emerald shiner	3,589		3,589
Spottail shiner	11		11
River shiner	12		12
Bigmouth shiner	4		4
Red shiner	129		129
Sand shiner	41		41
Bullhead minnow	121		121
Bluntnose minnow	3		3
Bigmouth buffalo	7	2	9
Smallmouth buffalo	2	9	11
Quillback	47		47
River carpsucker	6	1	7
Sucker species	20		20
Black bullhead	2		2
Channel catfish	17	10	27
Flathead catfish		9	9
Mosquitofish	18		18
Brook silverside	15		15
White bass	22	76	98
Largemouth bass	5	5	10
Green sunfish		15	15
Orangespotted sunfish	25	6	31
Bluegill	344	25	369
Sunfish (<i>Lepomis</i> sp.)	21		21
Green sunfish x Bluegill		3	3
White crappie	16	11	27
Black crappie	29	43	72
Walleye		1	1
Sauger		4	4
River darter	4		4
Western sand darter	1		1
Freshwater drum	26	15	41
Number of specimens	5,016	362	5,378
Number of species	34	20	39

Appendix B. (continued)

Table 18. Species and numbers of specimens collected in the Mississippi River at the Winfield station (MS-5).

Species	Seining	Electrofishing	Total
Shortnose gar	5	41	46
Longnose gar		3	3
Bowfin	2		2
American eel		2	2
Skipjack herring		1	1
Gizzard shad	54	76	130
Threadfin shad	12		12
Common carp	3	111	114
Golden shiner	4		4
Silver chub	11		11
Emerald shiner	1,681		1,681
Silverband shiner	1		1
Spottail shiner	1		1
River shiner	6		6
Red shiner	68		68
Channel mimic shiner	1		1
Ghost shiner	13		13
Bullhead minnow	303		303
Bigmouth buffalo		5	5
Smallmouth buffalo	2	2	4
Quillback	2		2
River carpsucker	1	7	8
Black bullhead	1		1
Channel catfish	1	7	8
Flathead catfish		5	5
Mosquitofish	205		205
Brook silverside	8		8
White bass	12	31	43
Largemouth bass	5	5	10
Warmouth	12	1	13
Green sunfish	3	8	11
Orangespotted sunfish	70		70
Bluegill	484	21	505
Green sunfish x Bluegill		3	3
White crappie	24	18	42
Black crappie	28	12	40
Walleye		1	1
Sauger		1	1
Freshwater drum	19	17	36
Number of specimens	3,031	378	3,421
Number of species	31	21	38

Appendix B. (continued)

Table 19. Species and numbers of specimens collected in the Mississippi River at the Alton station (MS-6).

Species	Seining	Electrofishing	Total
Shortnose gar	7	16	23
Longnose gar		2	2
American eel		2	2
Skipjack herring		6	6
Gizzard shad	131	238	369
Threadfin shad	1,178		1,178
Goldeye		1	1
Common carp		73	73
Golden shiner	1	2	3
Silver chub	4		4
Speckled chub	3		3
Emerald shiner	730		730
Silverband shiner	4		4
Spottail shiner	2		2
River shiner	377		377
Red shiner	433		433
Plains minnow	2		2
Bullhead minnow	287		287
Bigmouth buffalo		19	19
Smallmouth buffalo		7	7
Buffalofish species	1		1
River carpsucker	25	15	40
Golden redhorse		1	1
Shorthead redhorse		4	4
Black bullhead	324		324
Channel catfish	47	33	80
Flathead catfish		5	5
Mosquitofish	34		34
Brook silverside	5		5
White bass	6	42	48
Largemouth bass	8	3	11
Warmouth		2	2
Green sunfish	12	5	17
Orangespotted sunfish	1	2	3
Bluegill	163	51	214
Sunfish (<i>Lepomis</i> sp.)	29		29
White crappie	1	13	14
Black crappie		31	31
Sauger	1	3	4
Freshwater drum	2	35	37
Number of specimens	3,818	611	4,429
Number of species	26	25	38 ^a

^a A fisherman's catch included two additional species: paddlefish and black buffalo.

Appendix B. (continued)

Table 20. Species and numbers of specimens collected in the Mississippi River at the St. Louis station (MS-7).

Species	Seining	Electrofishing	Total
Shortnose gar		2	2
Longnose gar	1		1
Gizzard shad	623	13	636
Threadfin shad	36		36
Common carp		5	5
Golden shiner		2	2
Silver chub	1		1
Speckled chub	1		1
Emerald shiner	359		359
Silverband shiner	1		1
River shiner	60		60
Bigmouth shiner	3		3
Red shiner	112		112
Sand shiner	1		1
Channel mimic shiner	6		6
Western silvery minnow	1		1
Plains minnow	129		129
Central silvery minnow	1		1
Bullhead minnow	1		1
Smallmouth buffalo	2		2
River carpsucker	28		28
Channel catfish	23	1	24
Brook silverside	1		1
White bass	10	5	15
Bluegill	3	1	4
Sunfish (<u>Lepomis</u> sp.)	1		1
White crappie		4	4
Black crappie		5	5
Freshwater drum	1		1
Number of specimens	1,405	38	1,443
Number of species	23	9	28

Appendix B. (continued)

Table 21. Species and numbers of specimens collected in the Mississippi River at the Kimmswick station (MS-8).

Species	Seining	Electrofishing	Total
Shortnose gar		23	23
Longnose gar		5	5
American eel		1	1
Gizzard shad	75	76	151
Threadfin shad	10		10
Goldeye		2	2
Common carp	1	24	25
Silver chub	4		4
Speckled chub	29		29
Suckermouth minnow	1		1
Emerald shiner	946		946
River shiner	396		396
Spotfin shiner	4		4
Red shiner	3		3
Ghost shiner	1		1
Central silvery minnow	1		1
Bullhead minnow	24		24
Bigmouth buffalo		6	6
Black buffalo		1	1
Smallmouth buffalo		6	6
River carpsucker	34	5	39
Shorthead redhorse		1	1
Channel catfish	6	11	17
Blue catfish		5	5
Flathead catfish		8	8
Brook silverside	9		9
White bass	16	14	30
Spotted bass	1		1
Largemouth bass		11	11
Orangespotted sunfish	1		1
Bluegill	18	35	53
White crappie		1	1
Black crappie		2	2
Sauger		1	1
Freshwater drum	10	19	29
Number of specimens	1,590	257	1,847
Number of species	21	21	35

Appendix B. (continued)

Table 22. Species and numbers of specimens collected in the Mississippi River at the Brickeys station (MS-9).

Species	Seining	Electrofishing	Total
Shortnose gar		12	12
Bowfin		2	2
American eel		1	1
Skipjack herring	15		15
Gizzard shad	412	63	475
Threadfin shad	86		86
Herring species	4		4
Goldeye		1	1
Common carp		76	76
Silver chub	9		9
Speckled chub	9		9
Flathead chub	1		1
Emerald shiner	582		582
Silverband shiner	77		77
River shiner	1,047		1,047
Red shiner	95		95
Bullhead minnow	37		37
Bigmouth buffalo		12	12
Smallmouth buffalo		3	3
River carpsucker	55	2	57
Channel catfish	20	5	25
Stonecat	1		1
Flathead catfish		11	11
Mosquitofish	4		4
Brook silverside	3		3
White bass	16	11	27
Bluegill	33	5	38
Black crappie	1	2	3
River darter	1		1
Freshwater drum	45	6	51
Number of specimens	2,553	212	2,765
Number of species	21	15	29

Appendix B. (continued)

Table 23. Species and numbers of specimens collected in the Mississippi River at the Chester station (MS-10).

Species	Seining	Other Gear ^a	Total
Chestnut lamprey		1	1
Shovelnose sturgeon		20	20
Pallid sturgeon		1	1
Paddlefish		10	10
Shortnose gar	3	142	145
Longnose gar		18	18
Bowfin		3	3
American eel		6	6
Skipjack herring	7	9	16
Alabama shad		1	1
Gizzard shad	141	2,403	2,544
Threadfin shad	196	76	272
Goldeye		21	21
Mooneye		1	1
Common carp		432	432
Silver chub	4	2	6
Speckled chub	117		117
Suckermouth minnow	1		1
Emerald shiner	838	144	982
Silverband shiner	104	2	106
River shiner	1,107		1,107
Red shiner	51		51
Channel mimic shiner	1		1
Bullhead minnow	5		5
Largescale stoneroller		1	1
Blue sucker		1	1
Bigmouth buffalo		84	84
Black buffalo		27	27
Smallmouth buffalo		20	20
Quillback		6	6
River carpsucker	113	345	458
Black bullhead		2	2
Channel catfish	7	81	88
Blue catfish		59	59
Tadpole madtom		1	1
Stonecat		1	1
Flathead catfish		99	99
Mosquitofish		1	1
Brook silverside	21		21
White bass	13	57	70
Yellow bass		1	1
Spotted bass		1	1
Largemouth bass		2	2
Green sunfish		9	9
Orangespotted sunfish		2	2
Longear sunfish		1	1

Appendix B. (continued)

Table 23. (continued)

Species	Seining	Other Gear ^a	Total
Bluegill	11	38	49
White crappie		45	45
Black crappie		31	31
Walleye		2	2
Sauger		15	15
Freshwater drum	8	288	296
Number of specimens	2,748	4,512	7,260
Number of species	19	45	52

^a Electrofishing gear, hoop nets, gill nets, and trammel nets.

Appendix B. (continued)

Table 24. Species and numbers of specimens collected in the Mississippi River at the Cape Girardeau station (MS-11).

Species	Seining	Electrofishing	Total
Shortnose gar	1	5	6
American eel		2	2
Skipjack herring	10	1	11
Gizzard shad	41	65	106
Threadfin shad	97	1	98
Goldeye	4		4
Mooneye	8	3	11
Common carp		39	39
Silver chub	8		8
Speckled chub	31		31
Emerald shiner	315		315
Silverband shiner	22		22
River shiner	488		488
Red shiner	75		75
Channel mimic shiner	52		52
Ghost shiner	4		4
Plains minnow	1		1
Bullhead minnow	4		4
Blue sucker		1	1
Bigmouth buffalo		3	3
Smallmouth buffalo		1	1
River carpsucker	27	1	28
Channel catfish	9	2	11
Flathead catfish		4	4
Blackstripe topminnow	1		1
Brook silverside	31		31
White bass	9	2	11
Largemouth bass		3	3
Bluegill	7	19	26
White crappie		7	7
Black crappie		1	1
Ohio logperch	3		3
River darter	5		5
Freshwater drum	6	8	14
Number of specimens	1,259	168	1,427
Number of species	25	19	34

Appendix B. (continued)

Table 25. Species and numbers of specimens collected in the Mississippi River at the Commerce station (MS-12).

Species	Seining	Electrofishing	Total
Shovelnose sturgeon		2	2
Shortnose gar	2	13	15
Longnose gar	3	1	4
Skipjack herring		2	2
Gizzard shad	163	136	299
Threadfin shad	55		55
Herring species	3		3
Goldeye	1	1	2
Mooneye	7		7
Common carp	1	56	57
Golden shiner	1		1
Silver chub	2		2
Speckled chub	6		6
Emerald shiner	306		306
Silverband shiner	5		5
River shiner	52		52
Spotfin shiner	1		1
Red shiner	1		1
Channel mimic shiner	210		210
Plains minnow	1		1
Minnow (<u>Notropis</u> sp.)	1		1
Blue sucker		1	1
Bigmouth buffalo		1	1
Black buffalo		1	1
Smallmouth buffalo		4	4
Buffalofish species	4		4
River carpsucker	1	20	21
Shorthead redhorse		1	1
Sucker species	21		21
Channel catfish	19	22	41
Freckled madtom	1		1
Stonecat	15		15
Flathead catfish		10	10
Mosquitofish	1		1
Brook silverside	12		12
White bass	15	16	31
Largemouth bass		8	8
Green sunfish		1	1
Longear sunfish		1	1
Bluegill	7	5	12
Sunfish (<u>Lepomis</u> sp.)	3		3
White crappie		3	3
Black crappie		2	2
River darter	2		2
Freshwater drum	16	41	57
Number of specimens	938	348	1,286
Number of species	27	23	40

Appendix B. (continued)

Table 26. Species and numbers of specimens collected in the Mississippi River at the Cairo station (MS-13).

Species	Seining	Electrofishing	Total
Paddlefish		1	1
Shortnose gar	6	38	44
Longnose gar	3	1	4
Bowfin		1	1
American eel		4	4
Skipjack herring	19	2	21
Gizzard shad	183	82	265
Threadfin shad	386	1	387
Goldeye	5		5
Common carp		12	12
Silver chub	54		54
Speckled chub	3		3
Flathead chub	2		2
Emerald shiner	871		871
Silverband shiner	52		52
River shiner	76		76
Central silvery minnow	47		47
Bullhead minnow	22		22
Bigmouth buffalo		2	2
Buffalofish species	1		1
Quillback	2		2
River carpsucker	47		47
Channel catfish	23	9	32
Blue catfish	1		1
Flathead catfish		5	5
Brook silverside	6		6
White bass	30	18	48
Largemouth bass		6	6
Longear sunfish		7	7
Bluegill		14	14
Sunfish (<i>Lepomis</i> sp.)	17		17
White crappie		3	3
Black crappie		4	4
Ohio logperch	1		1
River darter	4		4
Freshwater drum	44	8	52
Number of specimens	1,905	218	2,123
Number of species	23	19	34

Appendix B. (continued)

Table 27. Species and numbers of specimens collected in the Mississippi River at the Dorena station (MS-14).

Species	Seining	Electrofishing	Total
Shortnose gar	3	16	19
Spotted gar	1	2	3
Longnose gar	1		1
Skipjack herring	8	3	11
Gizzard shad	293	68	361
Threadfin shad	163	1	164
Goldeye		1	1
Common carp		54	54
Grass carp		1	1
Silver chub	7		7
Emerald shiner	2,308		2,308
Silverband shiner	4		4
Weed shiner	1		1
River shiner	96		96
Blacktail shiner	1		1
Red shiner	1		1
Channel mimic shiner	1		1
Plains minnow	3		3
Central silvery minnow	1		1
Bullhead minnow	1		1
Bigmouth buffalo		6	6
Smallmouth buffalo		2	2
River carpsucker	20	4	24
Carp sucker species	78		78
Channel catfish	4	12	16
Flathead catfish		3	3
Brook silverside	36		36
White bass	39	7	46
Yellow bass		2	2
Largemouth bass	2	22	24
Green sunfish		3	3
Orangespotted sunfish		1	1
Longear sunfish	1	31	32
Bluegill		19	19
Sunfish (<i>Lepomis</i> sp.)	8		8
White crappie	7	3	10
Black crappie	1	3	4
Sauger		1	1
Freshwater drum	5	10	15
Larval fish	8		8
Number of specimens	3,102	275	3,377
Number of species	26	24	37

Appendix B. (continued)

Table 28. Species and numbers of specimens collected in the Mississippi River at the New Madrid station (MS-15).

Species	Seining	Electrofishing	Total
Shortnose gar	25	35	60
Spotted gar		1	1
American eel		3	3
Skipjack herring	17		17
Gizzard shad	373	90	463
Threadfin shad	81	2	83
Goldeye	8	1	9
Common carp	6	32	38
Silver chub	3		3
Emerald shiner	477		477
Silverband shiner	12		12
Weed shiner	86		86
River shiner	303		303
Blacktail shiner	20		20
Red shiner	2		2
Channel mimic shiner	24		24
Plains minnow	2		2
Central silvery minnow	10		10
Bullhead minnow	6		6
Fathead minnow	1		1
Carp sucker species	105		105
Channel catfish	12	7	19
Flathead catfish		5	5
Blackstripe topminnow	8		8
Mosquitofish	56		56
Brook silverside	436		436
Inland silverside	3		3
White bass	85	60	145
Largemouth bass	2	8	10
Warmouth	1	2	3
Green sunfish	1	3	4
Orangespotted sunfish	5	4	9
Longear sunfish		3	3
Bluegill	1	29	30
Sunfish (<u>Lepomis</u> sp.)	1		1
White crappie		3	3
Black crappie		3	3
Bluntnose darter	5		5
Mud darter	2		2
Freshwater drum	6	18	24
Striped mullet		1	1
Larval fish	4		4
Number of specimens	2,189	310	2,499
Number of species	32	20	39

Appendix B. (continued)

Table 29. Species and numbers of specimens collected in the Mississippi River at the Cottonwood Point station (MS-16).

Species	Seining	Electrofishing	Total
Shortnose gar	17	35	52
Longnose gar	2	4	6
American eel		2	2
Skipjack herring	61	4	65
Gizzard shad	505	149	654
Threadfin shad	331	1	332
Herring (<u>Dorosoma</u> sp.)	123		123
Goldeye	9	1	10
Mooneye	12		12
Common carp	6	14	20
Pugnose minnow	2		2
Silver chub	26		26
Speckled chub	1		1
Emerald shiner	39		39
Silverband shiner	70		70
Weed shiner	2		2
River shiner	137		137
Blacktail shiner	1		1
Channel mimic shiner	1		1
Plains minnow	1		1
Central silvery minnow	8		8
Bullhead minnow	33		33
Bigmouth buffalo		1	1
Smallmouth buffalo	27	6	33
Quillback		1	1
River carpsucker	6	8	14
Shorthead redhorse		1	1
Sucker species	4		4
Channel catfish	10	2	12
Blue catfish		2	2
Flathead catfish		5	5
Blackstripe topminnow	30		30
Mosquitofish	1		1
Brook silverside	69		69
Inland silverside	472		472
White bass	122	21	143
Spotted bass	1		1
Largemouth bass	10	7	17
Warmouth		3	3
Orangespotted sunfish	22	2	24
Longear sunfish	29	72	101
Bluegill	5	30	35
Sunfish (<u>Lepomis</u> sp.)	1		1
White crappie	7	7	14
Black crappie	10	1	11
Sauger	10	1	11

Appendix B. (continued)

Table 29. (continued)

Species	Seining	Electrofishing	Total
Ohio logperch	1		1
River darter	1		1
Freshwater drum	28	43	71
Number of specimens	2,253	423	2,676
Number of species	39	26	46

